NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 23-090

Dear Colleague Letter: Seeking US Industry and US Federal Agency Partners to Support Research Projects in Advanced Networking Systems

April 18, 2023

Dear Colleagues:

With this Dear Colleague Letter (DCL), the National Science Foundation (NSF) is seeking US industry partners and US Federal Agencies to form public-private partnerships (one or more) with NSF to co-design and jointly support research programs in advanced networking systems. The programs built through these partnerships will seek innovations to enhance the various aspects of next generation communications, sensing, networking, and computing systems. The programs are expected to fund collaborative fundamental research that transcends the traditional boundaries of individual disciplines to achieve the program goals. These teams may consist of investigators from Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited, and having a campus located in the US.

The National Science Foundation (NSF) has invested in a range of programs, including public and private partnerships, to advance the state-of-the-art in advanced networking systems research. In particular, NSF-funded research has greatly contributed to modern communication networks and systems through technologies like software-defined networking, programmable networks, disaggregation, computing and networking in the cloud, cognitive radios, spectrum sharing, massive MIMO antennas, millimeter-wave (mm-wave) transceiver devices, and artificial intelligence/machine learning (AI/ML). The far-reaching impact of innovation in networking systems has been remarkable, as shown by the critical role that broadband communication networks played in keeping people connected and businesses operational during the COVID-19 pandemic.

Recent NSF public-private partnerships with industry and other government agencies, e.g., direct partnerships with VMware and Intel, and consortia partnerships like Resilient and Intelligent NextG Systems (RINGS) and Platforms for Advanced Wireless Research (PAWR),

have had fundamental impacts and paved the way for network research at scale, on topics including resilient network design, open-source wireless network software, and the application of machine learning to wired/wireless networking. However, the demand for faster communications, increased functionality, broader availability, reduced resource consumption including size, weight, power and RF spectrum, lower latency, and service-aware networking requires research and innovation at unprecedented levels to meet the needs of our always-connected world. More effective integration between wired and wireless research communities and an increased focus on built-in security, as well as computing and machine learning advances into the next generation of networking technologies and management are needed.

Three NSF directorates (Computer and information Science and Engineering; Engineering; and Technology, Innovation and Partnerships) plan to build on past successes and provide the networking research and education community with the opportunity to pursue ambitious, fundamental research agendas that promise to define the future of advanced networking systems. We expect that the outcomes from the research projects and their products supported by these partnerships will fuel economic growth, improve national security, and result in products and services that will transform the everyday lives of people across the Nation and around the world.

INSTRUCTIONS TO SUBMITTERS / HOW TO RESPOND TO THIS DCL

NSF invites industry, non-profits and government agencies' interest in partnering with NSF to support basic research in the general areas described in this DCL. Please provide your inputs via the online submission form (link below). The submission form requests the following information (* indicates a required field):

- *Contact person name and affiliation.
- *Valid contact email address.
- Additional author name(s) and affiliation(s)
- *Summary of response (maximum 200 words).
- *Disclosure: Do we have your permission to cite your name and organization in any public disclosure of the information collected as part of this DCL? (Y/N)
- *Type of organization: choices of industry, non-profit, federal agency, other (describe what type in text box for those who selected other)
- *About your organization (100 words): Research domain(s), and discipline(s)/sub-discipline(s) in which your organization is interested in. Please include any additional relevant information such as your organization's total research and development budget (e.g., below $1million, between $1 million - $10 million, between $10 million - $50 million, or higher than $50 million), and percentage of this R&D budget that supports development of ideas in communication and networking technologies.
- Potential partnership areas: Please select the areas in which your organization would be

interested in exploring partnership with NSF
    - Technologies and Networking for Connected Medical and Healthcare Systems;
    - Machine Learning for High Performance Next Generation Networks;
    - Future Generation Data Center Networks;
    - Airborne and Satellite Networks;
    - Next Generation Optical Networks;
    - Novel Spectrum Uses;
    - Workforce Development;
    - Advanced Millimeter-Wave and Terahertz Technologies; and/or
    - Write in.
- Interest/Scope (maximum 400 words): Why is your organization interested in co-investing with NSF and other public/private partners? Please provide your rationale for co-investing and the size and scope of the research program that your organization would wish to participate in (e.g., total budget, size of individual awards, number of public/private partners in a joint program).
- Additional Resources (maximum 200 words): What resources (besides funds) can you provide to the researchers? These resources could include datasets, access to testbeds, foundry access, software, hardware evaluation boards, etc.
- Other Considerations (maximum 200 words): Any other relevant aspects that need to be addressed; or any other issues that NSF should consider, such as mechanism for repeatability and measurability of outcomes, and intellectual property concerns.

SUBMISSION DEADLINE AND OTHER CONSIDERATIONS

To respond to this DCL, please use the official form available at https://www.surveymonkey.com/r/NextGDCL

Contributions must be received on or before 5:00 PM Eastern time on May 15, 2023.

NSF will use the information submitted in response to this DCL at its discretion and will not necessarily provide responses to submissions. The information provided will be analyzed, may appear in reports, and may be shared publicly on agency websites. Respondents are advised that NSF is under no obligation to acknowledge receipt of the information or provide feedback to respondents with respect to any information submitted. No proprietary, classified, confidential, or sensitive information should be included in your response. NSF reserves the right to use any non-proprietary technical information in any resultant solicitation(s), policies, or procedures.

For questions concerning this DCL, and submission of input, please contact NextG@nsf.gov.

Sincerely,

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Assistant Director, Directorate for Engineering, NSF

Erwin Gianchandani
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